

Abstracts of Technical Articles from Bell System Sources

In January, 1932, a series of seven lectures by representatives of the Bell Telephone System was given before the Lowell Institute of Boston, Massachusetts. The general title of the series was "The Application of Science in Electrical Communication."

The lectures were as follows:

- "Social Aspects of Communication Development," by Arthur W. Page, A.B., Vice President, American Telephone and Telegraph Company.
- "An Introduction to Research in the Communication Field," by H. D. Arnold, Ph.D., Sc.D., Director of Research, Bell Telephone Laboratories.
- "Researches in Speech and Hearing," by Harvey Fletcher, Ph.D., Acoustical Research Director, Bell Telephone Laboratories.
- "Transoceanic Radio Telephony," by Ralph Bown, Ph.D., Department of Development and Research, American Telephone and Telegraph Company.
- "Talking Motion Pictures and Other By-Products of Communication Research," by John E. Otterson, President, Electrical Research Products, Inc.
- "Utilizing the Results of Fundamental Research in the Communication Field," by Frank B. Jewett, Ph.D., D.Sc., Vice President, American Telephone and Telegraph Company, President, Bell Telephone Laboratories.
- "Picture Transmission and Television," by Herbert E. Ives, Ph.D., Sc.D., Electro-Optical Research Director, Bell Telephone Laboratories.

These lectures comprise a book entitled *Modern Communication* recently published by Houghton Mifflin Company, Boston and New York.

*Three Superfluous Systems of Electromagnetic Units.*¹ GEORGE A. CAMPBELL. At the present time the electromagnetic, electrostatic, Heaviside-Lorentz, practical and international systems of electric and magnetic units are used side by side in pure and applied electromagnetism. The question is here raised whether the use of this multiplicity of units should continue indefinitely into the future when

¹ *Physics*, November, 1932.

the conversion tables for translating from any system to any other system show the essential equivalence of all five systems. It is recommended that but one system be legalized and used generally in place of the five systems, and that this universal system be the coherent meter-kilogram-second-ohm or definitive system. It is further recommended that the international ohm be used in this system. This unit is the one actually used in exploring the physical world because laboratory resistances for physics and test room resistances for engineering have been so calibrated. Of far greater importance is the fact that by retaining the international ohm it will be simpler, and completely feasible, to eliminate what Heaviside called "that unmitigated nuisance, the 4π factor of the present B.A. units" from our preferred system of units.

*A Compensated Thermionic Electrometer.*² K. G. COMPTON and H. E. HARING. A compensated single tube electrometer is described and the principles of its operation discussed. This apparatus has been found to compare favorably with "balanced tube" circuits both as regards stability and sensitivity and to be superior in many respects to the quadrant electrometers which usually have been used for the measurement of small currents, high resistance, or of voltage in circuits of high resistance and in those cases where only an infinitesimal current may be drawn from the source of the electromotive force. For most measurements the degree of compensation afforded has been found to be sufficient to make possible the use of dry cells or even properly controlled rectified alternating current as a power source.

*Combined Reverberation Time of Electrically Coupled Rooms.*³ A. P. HILL. The importance of controlling the reverberation time of auditoriums, music rooms, etc., is well recognized, and curves showing the optimum reverberation times for buildings of different volumes have been drawn and have attained general acceptance. In the recording and reproduction of sound for talking motion pictures, however, the reverberation problem is somewhat more complex than is the case for rooms in which sound is originally produced, due to the fact that there are three factors to deal with: first, the reverberation time of the space in which the sound is recorded; second, that of the space in which it is reproduced; third, the resultant reverberation time produced by electrically coupling these two spaces together. This is, of course, done in actual practice. This paper deals with the

² *Electrochemical Society Preprint* 62-17.

³ *Jour. Acous. Soc. Amer.*, July, 1932.

third factor and presents theoretical and experimental data showing how this resultant reverberation time may be determined. It is a matter on which little information has been available up to the present time.

*Air-Conditioning System for Low Humidities Required During the Manufacture of Telephone Cables.*⁴ F. H. KRUGER. This paper considers the requirements of an air-conditioning system to maintain the necessary humidities and temperatures in the cable storage rooms. The selection, design and performance of a combined refrigeration and moisture adsorption system are described. A two-stage refrigeration system cools and consequently dries the air which is delivered to the adsorption system and to the loop cable storage room for the removal of heat. The adsorption system supplies air of a low moisture content to the toll cable storage room. Air recirculated from the toll room maintains the correct humidities in the loop cable storage room. Silica gel placed in two beds or adsorbers dehydrates the air passing through the adsorption system. An air heater and cooler are successively used to condition the moistened gel in the adsorbers alternately. Finally the distribution of air and the humidity determinations in the storage rooms are discussed.

*Photo-conductivity.*⁵ FOSTER C. NIX. The influence of light on the flow of current through certain solids had been observed for several decades, but without important results prior to the brilliant work of Gudden, Pohl, and their collaborators. These investigators made the important advance of passing from the study of polycrystalline semiconductors having comparatively large conductivities, when not illuminated, over to single crystals of insulators. This enabled them to study the conductivity arising when the crystal is irradiated with light of suitable wave-length under simpler and more controllable conditions than had hitherto been obtainable. In many cases they were able, by using feeble light and low voltages, to distinguish between phenomena which they called "primary" or "secondary." The distinction is fundamental and is treated at length in this article. The article begins with an account of the phenomenon designated by Gudden and Pohl as primary and sometimes classified under the name *internal photoelectric effect* to distinguish it from the so-called external photoelectric effect (i.e., ejection of electrons from substances into surrounding gas or vacuum by incident light). The secondary phenomena are then taken up: first in cases where they coexist with

⁴ *Heating, Piping and Air Conditioning*, November, 1932.

⁵ *Reviews of Modern Physics*, October, 1932.

primary, then in cases where they are observed alone. In the closing section are discussed the cases in which electromotive forces are generated in solids by light.

*An Estimate of the Frequency Distribution of Atmospheric Noise.*⁶
R. K. POTTER. A relation between atmospheric noise intensity and frequency is estimated upon the basis of noise measurement data covering the frequency range between 15 and 60 kilocycles, and 2 and 20 megacycles.

⁶ *Proc. I. R. E.*, September, 1932.